"Celestial Objects," p. 294). The spectrum of the red component resembles that of *a* Herculis (Espin, *Astr. Nach.*, No. 2825).

U Cygni = Schjellerup 239*a* was discovered by Knott, in 1871, to vary from 7·7 to below 11 magnitude in a period of 466 days (Gore's "Variables," No. 163). It had previously been remarked by Birmingham for its deep ruby tint (*Astr. Nach.* No. 1809). An attendant at 62″ appears to fluctuate in light from 8 to 8·7 magnitude, in colour from a decided blue to white and reddish (Birmingham, Trans. R. Irish Academy, xxvi. 300; Tarrant, Journ. Liverpool Astr. Soc. vi. 124; *English Mechanic*, xliv. 368; Gemmill, *ibid.*, xlvi. 340). The spectrum of U Cygni is of III.*b* type, but the zones are feeble (Dunér, "Étoiles de la 3^e Classe," p. 73).

U Cassiopeiæ = OΣ (App.) 254.—A pair very similar to the preceding. The red star (= Schjellerup 280) varies from 7 to 9, the blue from 8 to 10 magnitudes, both in uncertain periods. Their distance, as measured by Dembowski in 1873, and by Burnham in 1881, is 58″·84 ("Publications of Washburn Observatory," i. 157).

U Puppis = Lalande 14551, found by Espin in 1883 to vary from 6 to 6·8 magnitude in 14d. 0h. 21½m. (*Monthly Notices*, xliii. 432). Burnham resolved it January 28, 1875, into two components, respectively of 6·5 and 8·5 magnitudes at 0″·8 (*Astr. Nach.*, No. 2062). Colour yellowish; spectrum of the solar kind. Proper motion insensible (Sadler, Journ. Liverpool Astr. Soc., v. 142). With a ninth magnitude star at 20″, it forms the fixed pair Σ 1097.

U Tauri is no longer included in lists of variables, the fluctuations noticed by Baxendell, 1865-71, having ceased to be perceptible (Schönfeld, *Jahresbericht*, Mannheim, xl. 51). It is unknown whether they affected one or both of two nearly equal components of 9·7 magnitude (distance 4½″), into which Knott divided the star, December 4, 1867 (Mems. R. A. Soc., xliii. 78). This interesting object has received little or no attention of late.

η Geminorum was discovered by Burnham at Mount Hamilton, November 11, 1881, to be made up of a third and a ninth magnitude star at 0″·96. "A splendid unequal pair," he remarked, "and likely to prove an interesting system" (Mems. R. A. Soc., xlvii. 204). He re-examined it at Dearborn a couple of months later, but we are not aware of any subsequent observation. The variability of η Geminorum in a period of 229 days was noticed by Schmidt in 1865. Its greatest extent of one magnitude is rarely attained, and the phases often seem nearly obliterated (Schmidt, *Astr. Nach.*, Nos. 1745, 1988, 2297.) The spectrum is an ill-marked specimen of Class III.*a*.

Y Virginis = Lalande 25086 was found by Schmidt in 1866 to vary from fifth to eighth magnitude in an undetermined period (*Astr. Nach.*, No. 1597). Ptolemy marked it of fifth, Abdurrahman Sûfi as approaching sixth magnitude (Schjellerup, "Description des Étoiles," p. 160). Piazzi catalogued it eighth, but observed it 6·7 and 7 magnitude. It figures in Lalande as of 6·5, in the Madras and Brisbane Catalogues as of sixth magnitude (NATURE, vol. xx. p. 248; "Harvard Annals," xiv. 456). Photometrically determined at Harvard, it came out of 5·7 magnitude. It is the only "Sirian" star showing considerable irregular fluctuations. Its duplicity was detected by Burnham in 1879, the components (0″·48 apart) being estimated as of 6·2 and 6·5 magnitudes. Re-measurements on three nights of 1881 gave no conclusive evidence of change (*Observatory*, iii. 92; Mems. R. A. Soc., xlvii. 190).

A. M. CLERKE.

NOTES.

THE medals of the Royal Society have this year been awarded as follows:—The Copley Medal to Prof. Huxley, for his investigations on the morphology and histology of vertebrate and invertebrate animals; the Rumford Medal to Prof. P. Tacchini for his investigations on the physics of the sun; and the Davy Medal to Mr. W. Crookes, for his investigations on the behaviour of substances under the influence of the electric discharge in a high vacuum. The Royal Medals have, with the approval of Her Majesty, been awarded to Baron Ferdinand von Mueller, for his investigations of the flora of Australia, and to Prof. Osborne Reynolds, for his investigations in mathematical and experimental physics. The medals will be presented at the anniversary meeting on November 30.

FREQUENT application having been made to Mrs. Spottiswoode for copies of papers by her late husband, the President of the Royal Society, she has decided to have them published in a collected form. The collection and editing of the mathematical papers she has intrusted to Mr. R. Tucker.

THE tone of the debate on the Education Estimates last Friday was eminently satisfactory. All who took part in it seemed to recognize that our system of elementary education is still very far from perfection. Sir John Lubbock evidently expressed the general feeling of the House of Commons when he complained that "the great faults of the present system were that it was too bookish and too dry." Mr. Mundella had a good deal to say—and said it well—on the necessity of the education of children being carried on to a much more advanced stage than that at which it now usually stops. "So long as the school life of the child was so short and limited," he said, "it was no use, in his judgment, talking about improved methods or an improved curriculum. So long as a child could enter a factory as a half-timer at ten years of age, or, as was the case in 8000 or 10,000 parishes in England, children were allowed to leave school after passing Standard IV., it did not matter what their curriculum was, or what their methods were, they could have no good results. It was impossible for them to force a number of compulsory subjects into a child who was to follow the ploughtail before he was eleven years of age. In the counties around London it was found that children left school after passing Standard IV., which they generally did about ten. There could not be a greater waste of money than to educate a child up to ten years of age at the expense of the State, and then turn him out into the world, the eventual result being that by the time he had reached thirteen he had forgotten everything he had learnt." After quoting from the report of Mr. Matthew Arnold as to the curriculum in force in Germany, showing that in Hamburg, for instance, there are thirteen obligatory subjects taught in the elementary schools, English being one of the subjects, Mr. Mundella pointed out that in Prussia no child leaves school until he is fourteen. Even after he leaves school, unless he can satisfy the school authorities, he must attend the continuation schools until he reaches sixteen or seventeen years of age.

ADMIRAL MOUCHEZ has received a magnificent set of photographs sent by the French Embassy at Pekin, illustrating Mr. Russell's lecture on the Pekin Observatory, of which we gave an account last week. These photographs will be exhibited in the astronomical museum of the Paris Observatory.

DURING the recent meeting of the British Association at Bath, Mr. G. J. Symons found in the Jenyns Library a manuscript meteorological register of considerable importance—namely, the original daily records kept by the Rev. James Cowe, at Sunbury Vicarage, Middlesex, from 1795 to 1839. It gives barometer, maximum and minimum temperatures, wind, rain, and remarks for each day. This record covers a period respecting which there has been much uncertainty as to both temperature and rainfall, and several meteorologists are of opinion that it should in some way be rendered generally accessible. The Rev. Leonard Blomefield (formerly Jenyns), to whom the manuscript belonged, has given his consent to its being copied, and an estimate has been obtained of the cost of copying it, and of preparing a lithographed reproduction as a foolscap folio volume of about 530 pages. This can be done, if sixty persons will subscribe a guinea each. As the volume will be one of great interest to all students of meteorology, Mr. Symons should not have much difficulty in obtaining the necessary funds. The sum of £24 has already been promised by various scientific societies and individual subscribers. Not one copy more than those subscribed for will be printed, so that the volume can only be obtained by subscription, and can never become cheap or common.

THE *American Meteorological Journal* for October contains an article by Mr. A. L. Rotch on the organization of the Meteorological service in Russia. Observations were first made there by the Academy of Sciences in 1726, but it was not until 1833 that a regular system was established. Weather telegraphy was begun in 1864, but little was done until 1872, when a daily weather report was commenced, but forecasts are not issued even now. The same number contains a summary of experiments by MM. C. Montigny and F. Dechevrens on the inclination of the wind, in contradistinction to its horizontal motion usually referred to. One interesting fact has come out of these experiments, viz. that the positive inclination (ascent) of the wind increases in proportion as the barometer falls, and *vice versâ*. We regret to see that the closing of the stations on Pike's Peak and Mount Washington, at least for the winter season, is an accomplished fact. The reason is said to be lack of funds, and the impossibility of using the observations for weather predictions. The detailed observations on Pike's Peak are about to be published by Prof. Pickering in the Annals of Harvard College.

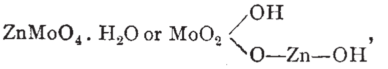
THE Pilot Chart of the North Atlantic Ocean for October, shows that the month of September was characterized by the occurrence of three West Indian hurricanes. By far the most notable of these was the great Cuban hurricane of September 1–7, referred to in NATURE, vol. xxxviii. p. 485. The first indications of this disturbance were noticed in the north-east trade-wind belt, east of the 60th meridian, on August 30 and 31. Taking a west by north course, the centre reached the Cuban coast on the night of September 3, spreading devastation on every side. After passing south of Havana on the 5th, a most remarkable feature was developed by a change of direction to the south of west, in violation of the usual law of motion, the storm reaching Mexico, near Vera Cruz, on the 7th. This unusual change of direction was apparently due to the fact that another well-defined storm originated in the same locality about the same time. This storm was central over the Bahamas on the 6th and 7th, while an area of very high barometer prevailed over the middle Atlantic States. There was a marked decrease in the amount of fog along the Transatlantic routes, which is attributed to the fact that only three depressions of any extent passed over those regions during the month. One of these, which developed hurricane force on the 12th in longitude 37°, subsequently passed north of the British Islands, after having crossed the entire ocean.

THE *Russian Gazette* of September 10/22, 1888, announces that the Committee of the Caspian Fisheries has deposited in the Astrakhan branch of the Imperial State Bank the sum of 5000 roubles (about £500) as a prize to be awarded for the discovery of means for the protection of fish against infection, and for the treatment of people suffering from the effects following the consumption of poisonous fish. The prize will be awarded to the person who will accomplish the following: (1) determine by careful analysis the physical and chemical nature of fish poison; (2) investigate by experiments on animals the action of fish poison on the heart, circulation of the blood, digestive organs, and nervous system; (3) determine the rapidity of the absorption of the poison in the digestive channels; (4) ascertain and describe the symptoms which distinguish healthy fish from those in a diseased condition; (5) indicate the measures to be adopted for preserving fish against the development of fish poison in them; (6) discover an antidote for, and the nature of the medical assistance to be rendered in cases of fish poisoning. Both Russian and foreign men of science may compete for the prize. Essays on the subject may be written either in the Russian, Latin, French, English, or German languages, and may be sent in print or manuscript not later than January 1/13, 1893, to the Ministry of Imperial Domains. The non-solution of questions Nos. 4 and 5 of the foregoing questions will not be considered an obstacle to the award of the prize in full, should the other four questions be satisfactorily dealt with. In case it be considered that not one of the essays or works submitted has solved the problem in its most essential parts, the Commission to which the essays will be submitted may award as a secondary prize the sum which shall have accrued as interest during the five years on the sum of 5000 roubles to the author of the work which shall have satisfactorily dealt with a portion of the programme, and which may facilitate a further study of the nature of fish poison.

THE following figures give some idea of the number of animals killed every year in Siberia for the sake of their furs. At the last summer fair of Irbit, which is a market for only a part of the furs exported from Siberia, no less than 3,180,000 furs of squirrels were offered for sale. Of these, 1,018,000 were killed in the forests of Yeniseisk, 455,000 in the Altai Mountains, 200,000 in Yakutsk, and 300,000 in Transbaikalia. A considerable number of the furs of squirrels killed in the last two provinces are exported directly both to China and to Russia, without passing through Irbit. It is worthy of note that this year there was a considerable decrease in the furs of the black squirrel. Only half a million of these furs were brought to the fair, as against more than a million in 1887. Of other furs there were 11,000 blue fox (*Canis lagopus*), from Obdorsk and Berezoff; 140,000 marmots, chiefly from the Altai; 30,000 polecats, 10,000 badgers, 1,300,000 hares, 2000 foxes, and numbers of bears and wolves. The extermination of fur-bearing animals goes on with such rapidity that there are whole regions where hunting has been completely abandoned in consequence of the complete disappearance of the Mustelidæ and the rarity of the squirrel.

THE November number of the *Kew Bulletin* contains valuable papers on Lagos rubber, Liberian coffee at the Straits Settlements, tea oil and cake, Demerara pink root, food grains of India (continued), Yoruba indigo, Trinidad ipecacuanha, treatment of vines in France, huskless barley, and ramie.

THE current number (vol. xxii. New Series, No. 5) of the Journal of the North China Branch of the Royal Asiatic Society is wholly occupied by the first part of a paper, by Mr. A. Henry, on the Chinese names of plants. This instalment contains 565 items. The names are those in colloquial use at Ichang, a town on the Yang-tsze, and the neighbourhood. First we get the Chinese name in Latin letters, then in Chinese characters; these are followed by the scientific name, which is in nearly every case taken from lists compiled at Kew, and by a general description of the plant, and occasionally the use to which it is put by the people. The second part will contain additions to the list, and notes concerning the plant-names that occur in Chinese botanical works.

THE zinc, manganese, and cobalt salts of molybdic acid, H_2MoO_4, have been obtained pure and in fine crystals by M. Coloriano, of Bucharest. Although molybdenum is so interesting an element, forming as it does such a beautifully graduated series of oxides and their corresponding salts, it is rather remarkable that so little is yet known concerning the most important of these latter, the molybdates. On attempting to obtain the zinc, manganese, and cobalt molybdates by double decomposition, using solutions of known strength of the nitrates of the metals in question, and of ammonium molybdate, amorphous precipitates were thrown down, consisting of hydrated acid salts of molybdic acid. On digesting these precipitates for a short time with water, it was found that they became rapidly converted into a mass of crystals, which were eventually separated from the remaining amorphous substances, washed and dried. They were then subjected to analysis, and were found to be normal molybdates, containing water of hydration so firmly combined that the first traces only commence to be expelled at 150° C. and perfect dehydration cannot be effected lower than the temperature of boiling sulphur (447°). Hence it is concluded that the water present is of "constitution." The crystals of zinc molybdate,  $ZnMoO_4 . H_2O$ or $MoO_2\begin{cases} OH \\ O{-}Zn{-}OH \end{cases}$, are transparent and colourless, forming acicular stellar groups. They dissolve but sparingly in water, readily, however, in dilute acids. The manganese salt, $MnMoO_4 . H_2O$, is probably isomorphous with the zinc molybdate just described, the crystals being very similar in form, but distinguished by possessing a bright yellow colour. The cobalt compound, $CoMoO_4 . H_2O$, is also similar in constitution, but the crystals are very much more beautiful. They exhibit a magnificent violet colour, and are almost insoluble in pure water, though readily dissolved by even very dilute acids. All three salts are probably isomorphous, and are similarly attacked by alkalies. An analogous nickel salt was also obtained, the crystals being of precisely the same habit as the three salts above described; but owing to the extreme slowness with which the amorphous acid salt is converted into the crystalline normal one, sufficient quantities have not yet been obtained pure for analysis. From the description given, however, by M. Coloriano, it may be accepted that zinc, manganese, cobalt, and nickel form isomorphous normal molybdates each containing one molecule of water of hydration.

AN interesting paper on "the nephrite question," by Dr. A. B. Meyer, is printed in the *American Anthropologist*. Dr. Meyer is of opinion that too much has been made of the fact that objects of nephrite and jade have been found in districts where these minerals in their natural state have not yet been discovered. It is rash, he thinks, to conclude that the objects must have been brought from a great distance. Prehistoric men may, he suggests, have found nephrite and jade in places where they have escaped our notice. "It may be that the people of prehistoric times continually sought the valuable material in a way quite different from the one we adopt. That boulders in the rivers formed their main source of supply is proved by the fact that a large number of the hatchets show the boulder characteristics, and they certainly left no stone unturned in their endeavour to find them, while we never think of looking for them in rivers. They may also have searched for still greater finds, the last view being supported by the fact that finds have been made as late as the last century in North Germany, in the sand near Potsdam, at Schwensal, near Merseberg, and at Leipzig, and these were evidently nephrite boulders of the North German diluviums. The remarkable block at Leipzig weighed over 38 kilogrammes; it is looked upon by Prof. Fischer and others as having been accidentally lost at that place, and they think that the raw material is of Asiatic origin. Considering that the block weighed nearly 100 pounds, this is not very likely, and I am of the opinion that this nephrite boulder came from Scandinavia, and that it was transported by ice."

LIEUT. D. BRUUN, of the Danish army, having had a moss dug out in Finderup, in Jutland, has made some interesting discoveries. In the moss were found trunks of oak, beech, and fir trees, from 6 to 30 inches in diameter. The branches had in some cases been cut off, but the bark remained. By the side of one of the oak trunks two earthen vessels were discovered, and near another a third, shaped like an urn. In the latter lay a sandal cut from a piece of leather, with flaps, and leather straps for tying to the ankle, the length of the sandal being 7 inches. It seemed as if the trunks of trees had been placed in a certain position for some purpose or another. About 20 feet further to the south, and at the same depth, viz. 6 feet, a yoke of oak was found, 5⅛ feet long and 3 inches thick, being fairly cylindrically cut out in the centre. At each end were holes, in one of which remained a strap of leather. Other implements of oak were also found, evidently used for carrying. Some of them seemed part of a wheel. Close to the yoke another earthen urn was discovered, which, like the three referred to, was surrounded with sprigs of heather and bramble. Formerly some horns of bullocks and the skeleton of a man in a fur coating were found in the moss. The various objects are now in the Copenhagen Museum, and are said to date from the early Iron Age.

DURING the past summer a great "kitchen-midden" at Grenaa, in Jutland, was the subject of research by the authorities of the Norse Museum at Copenhagen. It is situated a couple of miles from the sea in the midst of a wood. The layers in the midden were clearly defined, the numerous places of cooking being made conspicuous by ashes and remains of charcoal, together with fragments of coarse pottery. A large quantity of animal remains were found, viz. knuckles and bones, which had been split in twain or crushed and the marrow extracted. There were also many shells of oysters and other mollusks. The bones were those of deer, boar, seal, fox, wolf, dog, swan, and goose, with some of fish. Many flint weapons and implements were found, as well as some of horn and bone. Several of the latter had traces of ornamentation.

WE have received the Report of the Survey of India for the year ending September 30, 1887. During the year, the trigonometrical party has extended the triangulation on the Madras coast 170 miles, this being part of the general scheme to complete the triangulation on the coasts of India and Burmah. The aggregate results of the topographical surveys amounted to 17,510 square miles, and the areas of forests to 34,289 miles. In Basti, close upon 2,000,000 plots were cadastrally surveyed, the extent of each only averaging 0·27 of an acre; in Gorakhpur, in a considerably larger area, less than 1,000,000 plots were surveyed. After a little preliminary difficulty, it was found possible to advantageously employ village natives in this work. Altogether, 4273 square miles were cadastrally surveyed. A new map of Calcutta, on a scale of 50 feet to an inch, has also been undertaken. The longitude determinations have been suspended, but the latitudes of five stations on the meridian of 80° have been completed. Advantage has been taken of the various military operations in Upper Burmah to record additional geographical information. The total number of maps issued amounted to 178,398. At Dehra Dun, photographs of the sun were taken for the Solar Physics Committee, South Kensington, on every available day—in all, sixty-three days being lost. Attempts were also made to photograph the corona by means of stained plates, but their success seems somewhat doubtful. As usual, the Report is accompanied by maps showing the extent of the various operations.

THE Sebastopol Biological Station, under Dr. Sophie Pereyaslavtseva, continues to bring out important biological works. In the last number of the *Bulletin* of the Moscow Society of Naturalists (1888, No. 2), Mrs. Pereyaslavtseva publishes (in French) the first instalment of a most valuable work which she has written in association with Miss Marie Rossiiskaya, on the embryogeny of the Amphipods, being a continuation of her previous studies in the embryogeny of Rotifers. The development of *Gammarus pœcilurus* is described in the first part of the work, and an idea of its detailed character may best be given by mentioning that the various stages of development of that one species are illustrated by no less than one hundred and twenty microscopical sections beautifully printed in colours. Two more representatives of Amphipods (*Caprella* and *Orchestia*) have been studied in the same way, while the lady students who work at Sebastopol under the learned lady-director of the station are now studying other species of Amphipods, and especially of *Gammarus;* so that a complete work on the embryogeny of that important zoological division is expected to be ready by the end of the autumn. For the present, Mrs. Pereyaslavtseva refrains from suggesting general conclusions, but at the end of her monograph she points out that throughout the embryonal development of *Gammarus pœcilurus* the cells of its tissues are endowed with amœboid movements. Those movements are less pronounced in the ectodermic and mesodermic layers, and yet the cells of the former are moving and protruding pseudopods even when the endodermic layer has taken the shape of a fully formed pouch, and its constitutive cells may be considered as epithelium. As to the cells of the mesoderm, they maintain the capacity of both locomotion and overlapping (*chevauchement*) even at very advanced stages of the development of the embryo—that is, until the elaboration of the muscular tissue has been completed. These phenomena have been noticed in all the three genera of Amphipods already studied, and most probably they are common to all Amphipods.

MESSRS. MARION AND CO. send us an account of a "detective camera" which has been planned to meet the requirements of the inexperienced as well as the experienced in photography. It has the appearance of a leather dressing-case or despatch-box, and has the special advantage that the person using it sees the exact picture he is to get on his plate, the same lens giving the image on the screen and taking the negative. Another "detective camera" of which Messrs. Marion and Co. have issued a description is in the form of a book, and can be used secretly, since there is nothing to indicate its real purpose.

IN an article on "Irregular Star Clusters" (NATURE, November 1, p. 13), it was stated, with regard to an apparent member of a scattered group in Ophiuchus, that its position "was found, by the comparison of photographs taken by M. von Gothard in 1886 with Vogel's measures of eighteen years previously, to have changed to the extent of 45″, or at the rate of 2½″ annually (*Astr. Nach.*, No. 2777)." Dr. H. Kreutz, of the Kiel Observatory, writes to us to say that more recent measures of Dr. B. von Engelhardt (*Astr. Nach.*, No. 2859) have proved this to be incorrect. The difference between Gothard's photographs and Vogel's measures was due to an error in Vogel's work.

THE additions to the Zoological Society's Gardens during the past week include two White-tailed Eagles (*Haliætus albicilla*), British, presented by Mr. R. H. Venables Kyrke; two Short-eared Owls (*Otus brachyotus*), captured in the Red Sea, presented by Captain John Marr; a Little Grebe (*Tachybaptes fluviatilis*), British, presented by Mr. Howard Bunn; two Spotted Ichneumons (*Herpestes nepalensis* ♂ ♂), an Indian Otter (*Lutra nair* ♂) from India, a Sclavonian Grebe (*Podiceps auritus*), British, deposited; four Knots (*Tringa canutus*), European, purchased.

OUR ASTRONOMICAL COLUMN.

THE TOTAL SOLAR ECLIPSE OF AUGUST 29, 1886.—Part 5 of vol. xviii. of the Annals of the Harvard College Observatory, contains an account by Mr. W. H. Pickering of his expedition to Grenada in 1886 in order to observe the total eclipse of August 29; and some points in his report have recently been commented on by Mr. W. H. Wesley (*Observatory*, October 1888) and Mr. Ranyard (*Knowledge*, November 1888). Mr. Pickering's original plan of work had been a very wide one, and he took out a great variety of instruments with him, but no assistants besides his wife and a lady friend. It was very late in August before he arrived at Grenada, and this circumstance and the frequent obscuration of the sun before totality on the day of the eclipse caused several items of his programme to result in complete failure. The long focus photoheliograph and the actinometer under Mr. Pickering's own superintendence gave no results, but Mrs. Pickering secured three photographs with a couple of short-focus cameras, and Mr. Glean one with a telescope of 4 feet focus. One of Mrs. Pickering's photographs supplies some very curious features in the shape of some very faint extensions of the corona on the western side of the sun. One of these is a prolongation of a bright synclinal mass, and rises in a narrow jet to a height of 48′ from the limb, and then divides into three parts, two falling back towards the sun right and left of the centre ray, which attains a total height of 60′, then to bend over in a precisely similar fashion. Another extension further to the north rises to about the same height, 60′, and then curves downward again.

Mr. Pickering's spectrum photographs afforded little fresh information, but confirmed Prof. Tacchini's observation of "white" prominences; and two of his small coronal photographs were used to give a determination of the brightness of the corona. These gave the total actinic brilliancy of the corona with the surrounding sky as 700 units, or ten times that of the full moon with surrounding sky. But the *intrinsic* actinic brightness of the brightest part of the corona was only 0·03, whilst the average intrinsic brightness of the sky 1° from the sun on a fine day was determined to be 1200 times as great.

COMET 1888 *f* (BARNARD).—Dr. R. Spitaler has computed the following elements and ephemeris for this comet from observations made at Mount Hamilton, October 30, at Vienna, November 2, and at Hamburg, November 5:—

T = 1888 September 10·82914 Berlin M.T.

$$\left.\begin{array}{rrrr} & {}^\circ & ' & '' \\ \pi = & 65 & 0 & 12 \\ \Omega = & 137 & 34 & 17 \\ \iota = & 55 & 17 & 10 \end{array}\right\} \text{Mean Eq. } 1888{\cdot}0.$$

$$\log q = 0{\cdot}16873$$

Error of middle place (O − C).

$$\Delta\lambda \cos\beta = -\ 4''\ ;\ \Delta\beta = 0.$$

Ephemeris for Berlin Midnight.

1888.	R.A. h. m. s.	Decl. ° ′	Log Δ.	Log *r*.	Brightness.
Nov. 16	10 5 37	12 25·4 S.	0·2197	0·2414	0·96
20	10 9 56	11 34·3	0·2141	0·2487	0·95
24	10 13 50	10 39·0	0·2081	0·2561	0·94
28	10 17 46	9 38·2 S.	0·2018	0·2636	0·94

The brightness at discovery is taken as unity.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 *NOVEMBER* 18–24.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on November 18

Sun rises, 7h. 26m.; souths, 11h. 45m. 26·0s.; sets, 16h. 4m.: right asc. on meridian, 15h. 37·2m.; decl. 19° 25′ S. Sidereal Time at Sunset, 19h. 57m.

Moon (Full on November 18, 15h.) rises, 4h. 32m.; souths, 0h. 5m.*; sets, 7h. 49m.*: right asc. on meridian, 3h. 59·3m.; decl. 16° 30′ N.